**A COMPARATIVE STUDY BETWEEN IASTM VERSUS CUPPING**

**THERAPY ON ADHESIVE CAPSULITIS IN PATIENTS WITH**

**GRADE II FOR IMPROVING PAIN AND FUNCTIONAL DISABILITY**

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**BACKGROUND:** Inflammation is the most common ailment of the Capsule. Especially it is characterised by pain and loss of function in form of range of motion of the shoulder joint.

Conventional physiotherapy has been a great choice of treatment for such pain. Recent articles support the use of IASTM, cupping therapy and stretching for the treatment of adhesive capsulitis.  **AIMS AND OBJECTIVES:** To identify the effectiveness of IASTM, Cupping therapy and conventional physiotherapy on pain, Range of motion and functional disability.

**METHODOLOGY:** 30 Participants after being screened for eligibility criteria divided into 2 groups by simple random sampling. Group 1 received intervention in the form of IASTM along with their regular training, Group 2 received regular training with Cupping Therapy over the course of 12 weeks. Effectiveness Parameters were improvement in VAS and SPADI. They were assessed at baseline and at the end of the study. Post intervention data was analysed using SPSS software using t test and ANOVA.

**RESULT:** There was significant difference in parameters in all the groups from baseline and end of the study (p<0.001). However, IASTM was superior to the change of outcomes like VAS and SPADI.

**CONCLUSION:** The result of this study demonstrates that IASTM statistically improves the pain and functional disability with grade II adhesive capsulitis patient.

**Keywords:** Adhesive capsulitis, IASTM, Graston method, conventional physiotherapy, VAS, SPADI.

 **INTRODUCTION**

The Gleno-humeral joint is a [synovial joint tha](https://www.kenhub.com/en/library/anatomy/arthrology)t attaches the [upper limb to](https://www.kenhub.com/en/library/anatomy/upper-extremity-anatomy) the axial skeleton. It is a ball-and-socket joint that is formed between the Glenoid fossa of [scapula and](https://www.kenhub.com/en/library/anatomy/scapula) the head of [humerus. Th](https://www.kenhub.com/en/library/anatomy/the-humerus)e joint is surrounded by many muscles and soft tissues like ligaments, tendons, bursae and capsule. The shoulder joint is the most mobile joint but the mobility comes on the sake of stability. (1,2,3,4) The stability of the joint comes from the capsule it surrounds. Also, by the cuff that is formed by four muscle tendons that is known as the rotator cuff. The capsule remains lax to allow for mobility of the upper limb. It relies on ligaments and muscle tendons to provide reinforcement. The anterior capsule is thickened by the three glenohumeral ligaments while the tendons of the rotator cuff muscles spread over the capsule blending with its external surface. (3,4,5). These tendons form a continuous covering called the rotator capsule. It is comprised of the [supraspinatus sup](https://www.kenhub.com/en/library/anatomy/supraspinatus-muscle)eriorl[y, infraspinatus a](https://www.kenhub.com/en/library/anatomy/infraspinatus-muscle)[nd teres minor pos](https://www.kenhub.com/en/library/anatomy/teres-minor-muscle)teriorly, subscapularis anteriorly and the long head of [triceps brachii inf](https://www.kenhub.com/en/library/anatomy/triceps-brachii-muscle)eriorly. The internal surface of the joint capsule is lined by a synovial membrane. (11,22,35)

Adhesive capsulitis often referred to as frozen shoulder, is characterized by initially painful and later progressively restricted active and passive glenohumeral (GH) joint range of motion with spontaneous complete or nearly-complete recovery over a varied period of time. (24) This inflammatory condition causes fibrosis of the GH joint capsule, is accompanied by gradually progressive stiffness and significant restriction of range of motion. The maximum restriction is seen in the external rotation of the shoulder joint. (10) Although frozen shoulder and adhesive capsulitis (AC) are frequently used as synonyms, AC is a distinct pathological entity, while frozen shoulder solely refers to any condition that restricts active or passive glenohumeral motion e.g., conditions such as subacromial bursitis and calcific tendonitis were previously termed as frozen shoulder as they could lead to a stiff and painful shoulder. (43)

It is a self limiting disorder of the shoulder joint it cn be cured on its own in 2 years of time. It starts with the Freezing stage in which any movement of the shoulder causes pain, and the shoulder's ability to move becomes limited.(50)This stage lasts from 2 to 9 months. The second stage is the Frozen stage. Pain might lessen during this stage. However, the shoulder becomes stiffer. Activities are limited in this stage. It may lasts from 4 to 12 months.(10,16,26).The third stage is The Thawing stage. The shoulder's ability to move begins to improve. This stage lasts from 5 to 24 months.

 Adhesive capsulitis often referred to as frozen shoulder, is characterized by initially painful and later progressively restricted active and passive Glenohumeral (GH) joint range of motion with spontaneous complete or nearly-complete recovery over a varied period of time. This inflammatory condition causes fibrosis of the GH joint capsule, is accompanied by gradually progressive stiffness and significant restriction of range of motion.(18)

Many treatment options are available for the early cure of the adhesion of the capsule and restoration of the movement. Most common ones are the use of NSAIDs and corticosteroid injections and oral tablets and physiotherapy.(11) Physiotherapy includes variety of joint mobilisation techniques like Kalternborn and mulligan technique of mobilisation. Along with mobilisation strengthening exercise of the surrounding musculature is also beneficial in improving the range and limited activities of daily life. Exercise therapy and electrotherapy in the form of TENS or IFT to manage the pain and spasms around the joint is mainly used. There is a little effect of ultrasound on the frozen shoulder. Other techniques involve soft tissue mobilisation like IASTM and Cupping therapy. They work by lifting the fascia and improving the movements that were being restricted by the tightness or fibrosis of the fascia. Instrument assisted soft tissue mobilization (IASTM) is a skilled myofascial intervention used for soft-tissue treatment. It is based on the principles of James Cyriax cross-fiction massage. It is applied using instruments that are usually made of stainless steel with beveled edges and contours that can conform to different body anatomical locations and allows for deeper penetration. It is used for the detection and treatment of soft tissue disorders.41Cupping therapy can play an important complementary role in treating and recovering from frozen shoulder. Cupping therapy, has been used for thousands of years and uses specialized cups with thick round lipped glass or plastic. The cups are depressurized and placed directly on the skin of the client. Skin, fascia and muscle are pulled up into the cup stretching the tissue and drawing fresh blood into the area, providing nutrients to aid healing. 14

**PROCEDURE**

After collecting the written consent form the patients selected by inclusion and exclusion criteria, they were divided into two groups - group A and group B. •Group A was treated with IASTM + exercises and Group B will be treated with CUPPING THERAPY + exercises.

The demographic and clinical data was collected from each patient at the beginning of the study as pre-test data and after 12 weeks as post-test data.

All the pre and post-test data of outcome measures was kept safely for analyzing and interpretation of results.
**GROUP A:**

Patient were applied IASTM in combination with standard exercise program three days a week for 12 weeks.

* Iastm tool - Polar
* Technique – Graston technique
* Session time- 35 min.
* IASTM, done at 30-60 degrees angle for 40-120 seconds.

The patient was given comfortable sitting position with the area to be treated exposed well. Firstly, the tools and the skin of the patient were sanitized and then moisturizer was applied to it. Then the scraping was done on the tender nodules that were present on the upper traps and the supraspinatus tendon was more focused. This was whole shoulder joint complex was completely treated with the tool. The patient were advised to apply moisturizer for the rest of the day for the burning sensation they might get from the scraping and were not allowed to apply any anti- inflammatory ointment or ice or heat that could stop the infiltration of the inflammatory cells caused by the micro trauma done to the region.

This was done for every three days a week for 12 weeks as an adjunct to the exercise therapy that the patients were taking every day of the week for 12 weeks.

 **GROUP B:**

Patients were applied CUPPING THERAPY in combination with standard exercise program three days a week for 12 weeks.

* Cupping therapy method – oil cupping
* Technique- dynamic and static
* Session time- 40 min.

The patient was given a relaxed position and the part to be treated was exposed. The skin and the tool were prepared sanitized. The cups were applied around the shoulder joint including the upper trapezius muscle and the supraspinatus tendon along with all the rotator cuff tendons.

The cup were placed for about 35 -40 minutes and in middle of them many times moved to perform the cupping massage to the shoulder joint as done in the dynamic cupping. The patient then performed all the prescribed conventional physiotherapy exercises.

**CONVENTIONAL PHYSIOTHERAPY EXERCISES**

 These exercises were performed by both the groups. The Exercises included the ROM exercise and stretches. They were low in intensity pain free and in the form of passive or active assisted of active. Gradually over time they were progressed to resisted

exercise.

* pendulums (1 min clockwise, 1 min counter-clockwise)
* internal rotation in standing repeat 8 to 12 times
* horizontal adduction in standing repeat 8 to 12 times
* pulley for elevation in sitting or standing repeat 8 to 12 times
* forward flexion in supine using own hand repeat 8 to 12 times
* external rotation using pipe/stick in supine repeat 8 to 12 times
* extension in standing using pipe/stick in supine repeat 8 to 12 times.

Gradually all these exercises were progressed to resisted exercises performed with either thera band or sand bags. The patients were also advised to carry out the exercises at home 2 times a day.

**RESULT AND DATA INTERPRETATION**

Pre and post intervention evaluation of outcome measure had collected through VAS and SPADI and analysed with statistical package SPSS 20.0. Student t-test, paired t-test and mean improvement has been analysed.

|  |  |  |
| --- | --- | --- |
| VARIABLE  | GROUP A  | GROUP B  |
| Mean± SD  | Mean± SD  |
| AGE  | 31.33± 5.13  | 29.67± 6.60  |
| GENDER (MALE: FEMALE)  | 3:2  | 7:8  |

The demographic variables and pre-intervention outcome measures between the groups were evaluated by Student‘s t-test. The parametric test results within the group and between the groups were obtained and statistically analysed using Student ‘s paired and unpaired t-tests,

respectively.



 Following are the values of the variables pre and post interventions.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| VARIABLE  |   | MEAN  | SD  | P  |
| VAS  | PRE  | 6.06  | 2.26  | <0.05  |
| POST  | 2.53  |   |
|  |  |  |  |  |
| SPADI  | PRE  | 60.66  | 22.67  | <0.05  |
| POST  | 25.33  |   |

  GROUP 1: MEAN AND SD of IASTM group pre and post variables

The mean and SD are 6.06 and 2.26 for VAS and for SPADI they are 60.66 and 25.33 respectively. The p value being less than 0.05 it shows statistically significant difference

 **GROUP 2:** MEAN AND SD of Cupping therapy group pre and post variables

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| VARIABLE  |   | MEAN  | SD  | P  |
| VAS  | PRE  | 6.2  | 0.29  | <0.05  |
| POST  | 4.5  |   |
| SPADI  | PRE  | 62  | 2.99  | <0.05  |
| POST  | 45.33  |   |

 The mean and SD are 6.2 and 4.5 for VAS and for SPADI they are 62 and45.33 respectively.

**WITHIN GROUP:**

**GROUP A**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| VAS  | N  | MEAN  | SD  | MEAN DIFF.  | DF  | T  | P  | RESULTS  |
| PRE-TEST  |  15  | 6.06  | 2.2  | 4  | 14  | 1.76  | 0.00  | SIG.  |
| POST TEST  | 15  | 4.53  | 3.4  | 4  | 14  | 1.76  | 0.00  | SIG.  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| SPADI  | N  | MEAN  | SD  | MEAN DIFF  | DF  | T  | P  | RESULTS  |
| PRE SPADI  | 15  | 62.66  | 20.95  | 4  | 14  | 1.76  | 0.00  | SIG.  |
| POST SPADI  | 15  | 45  | 34.9  | 4  | 14  | 1.76  | 0.00  | SIG.  |

**INTERPRETATION**: From the values obtain by performing the students t test on the sample within the groups. The obtain mean for Pre-test and Post-test are 6.06 and 4.53. Whereas for SPADI they are 62.66 and 45 respectively. The T value being 1.76 and p is <0.05 showing statistically significant difference. There has been statistically significant improvement in both the outcomes post intervention.

**GROUP B:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| VAS  | N  | MEAN  | SD  | MEAN DIFF.  | DF  | T  | P  | RESULTS  |
| PRE-TEST  |  15  | 5.73  | 4.6  | 4  | 14  | 1.76  | 0.03  | SIG.  |
| POST TEST  | 15  | 4.53  | 3.4  | 4  | 14  | 1.76  | 0.03  | SIG.  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| SPADI  | N  | MEAN  | SD  | MEAN DIFF  | DF  | T  | P  | RESULTS  |
| PRE SPADI  | 15  | 62  | 217  | 4  | 14  | 1.76  | 0.00  | SIG.  |
| POST SPADI  | 15  | 45.3  | 340  | 4  | 14  | 1.76  | 0.00  | SIG.  |

**INTERPRETATION**: From the values obtain by performing the students t test on the sample within the groups. The obtain mean for Pre-test and Post-test are 5.73 and 4.53. Whereas for SPADI they are 62.66 and 45.3 respectively. The T value being 1.76 and p is <0.05 showing statistically significant difference. There has been statistically significant improvement in both the outcomes post intervention.

**WITHIN GROUP:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| SPADI  | N  | MEAN  | SD  | MEAN DIFF  | DF  | T  | P  | RESULTS  |
| PRE SPADI  | 15  | 62.66  | 20.95  | 4  | 14  | 1.76  | 0.00  | SIG.  |
| POST SPADI  | 15  | 45  | 34.9  | 4  | 14  | 1.76  | 0.00  | SIG.  |

**GROUP A**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| VAS  | N  | MEAN  | SD  | MEAN DIFF.  | DF  | T  | P  | RESULTS  |
| PRE-TEST  |  15  | 6.06  | 2.2  | 4  | 14  | 1.76  | 0.00  | SIG.  |
| POST TEST  | 15  | 4.53  | 3.4  | 4  | 14  | 1.76  | 0.00  | SIG.  |

**INTERPRETATION**: From the values obtain by performing the students t test on the sample within the groups. The obtain mean for Pre-test and Post-test are 6.06 and 4.53. Whereas for SPADI they are 62.66 and 45 respectively . The T value being 1.76 and p is <0.05 showing statistically significant difference. There has been statistically significant improvement in both the outcomes post intervention.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| SPADI  | N  | MEAN  | SD  | MEAN DIFF  | DF  | T  | P  | RESULTS  |
| PRE SPADI  | 15  | 62  | 217  | 4  | 14  | 1.76  | 0.00  | SIG.  |
| POST SPADI  | 15  | 45.3  | 340  | 4  | 14  | 1.76  | 0.00  | SIG.  |

**GROUP B:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| VAS  | N  | MEAN  | SD  | MEAN DIFF.  | DF  | T  | P  | RESULTS  |
| PRE TEST  |  15  | 5.73  | 4.6  | 4  | 14  | 1.76  | 0.03  | SIG.  |
| POST TEST  | 15  | 4.53  | 3.4  | 4  | 14  | 1.76  | 0.03  | SIG.  |

**INTERPRETATION**: From the values obtain by performing the students t test on the sample within the groups. The obtain mean for Pre-test and Post-test are 5.73 and 4.53. Whereas for SPADI they are 62.66 and 45.3 respectively . The T value being 1.76 and p is <0.05 showing statistical significant difference. There has been statistical significant improvement in both the outcomes post intervention.

  **BETWEEN THE GROUPS:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| TEST  | N  | MEAN  | SD  | MEAN DIFF.  | DF  | T  | P  | RESULTS  |
| GROUP A  | 30  | 35.33  | 126.6  | 18.67  | 28  | 1.76  | 0.03  | SIG.  |
| GROUP B  | 30  | 16.66  | 238.0  | 18.67  | 28  | 1.76  | 0.03  | SIG.  |

 **INTERPRETATION**: From the values obtain by performing the students t test on the sample within the groups. The obtain mean for Pre-test and Post-test are 35.33 and 16.66.The T value being 1.76 and p is <0.05 showing statistical significant difference. There has been statistical significant improvement in both the outcomes post intervention.

**12. RESULT OF THE STUDY:**

Thus the results of this study demonstrate that IASTM device along with conventional physiotherapy exercise statistically improves the grade II adhesive capsulitis in terms of VAS and SPADI.

**DISCUSSION**
For this study 30 subjects were taken. Randomization was done by simple chit method in to 2 groups Group A (IASTM), Group B (CUPPING THERAPY) .Group A was given graston technique soft tissue mobilisation around the shoulder complex with the help of polar tool + Conventional therapy, Group B was given cupping therapy around the shoulder joint + Conventional therapy.

 The groups in this study were heterogeneous groups with both male and female population, future studies could be done taking up a homogenous samples with literature review suggests that the incidence of adhesive capsulitis is more in the female population.

 Both the treatment techniques in the study showed significant improvement in VAS (Visual Analogue Scale) and SPADI (Shoulder Pain and Disability Index). During this study following the treatment session Pain scores were decreased markedly. Patients reported no pain or improvement on a greater extent.

It was noted secondarily that much milder words were being used to describe the pain and discomfort following treatments.

Group 1 showed statistical significant effect in the pain, range of motion and the disability. IASTM along with conventional therapy as an adjunct can be said to be the best treatment of choice for the patient with grade 2 adhesive capsulitis.

The results of the study are in accordance with the study of Sami et al. According to Sami et al(5) (2020) mobilisation combined with traditional physiotherapy for frozen shoulder treatment can be more effective at increasing shoulder ROM and reducing pain. Frozen shoulder patients can also benefit from strengthening exercises, such as ROM exercises, which can be done with or without electrotherapy.

So taking in to consideration the study tried and explored the uses of mobilisation in the terms of IASTM in the reference from the study of Amita et al(6) (2020), she used IASTM in adhesive capsulitis patients. Instrument aided soft tissue mobilisation combined with conventional therapy and the study results was shown to be more effective than conventional treatment for increasing mobility and function in adhesive capsulitis in her study.

The use of IASTM is not limited to the degenerative or age or disease related musculoskeletal disorders it has proved to be of great uses in the sports medicine also. According to Gohil et al.7(2020), the efficacy of IASTM in treating athletes with Gleno-humeral internal rotation limitation. They discovered that using IASTM on the posterior shoulder muscles and capsule increased both internal and horizontal adduction ranges of motion and flexibility. They discovered that using IASTM on the posterior shoulder muscles and capsule increased both internal and horizontal adduction ranges of motion and flexibility.

The reason behind this improvement is Various direct compressive stroke techniques are used to provide soft tissue mobilisation utilizing specially designed tools. By triggering a localized inflammatory response that releases cellular mediators and growth factors, IASTM therapy can repair and remodel soft tissues. The IASTM assists with actuating connective tissue redesigning by extreme fibrosis re-ingestion and helping fibroblast enrollment, which prompts collagen fix and recovery. Thus, this will prompt disturbance of scar tissue and fascial restriction.

It has been studied from a period of time that Instrument aided soft tissue mobilization is useful in the shoulder girdle restriction resolving meanwhile also help in pain decreasing that occurs due to stiffness.. It was studied by Jooyoung Kim et al.10 (2017). They treated the patient with IASTM as well as stretching, strengthening exercise, and cryotherapy in their study, and they found that there was an improvement in soft tissue function, as well as increased range of motion and pain relief.

IASTM have a neurophysiological effect as it stimulates mechanosensitive neurons through skin deformation by the instrument. Mechanosensitive neurons include mechanoreceptors which are responsible for two-point discrimination and mechano-nociceptors which are responsible for pain perception.

It affects the vascular response to the injured soft tissue, through increasing the blood flow. As evident by Loghmani et al, who studied the effect of IASTM on the knee MCL in rats, and found an increase in tissue perfusion and increase in the proportion of arteriole-sized blood vessels in the treated leg.

Similar study was carried out on Indian population with adhesive capsulitis by Application of IASTM in frozen shoulder was studied by rita sharma et. al. (2021). They treated the patient with IASTM and discover that IASTM therapy showed substantial improvements in pain, function, and quality of life in shoulder injuries and diseases, as well as increased joint mobility In the results of this study both the groups have shown significant decrease in pain and disability. Thus cupping therapy is also beneficial in improving the mobility pain and disability. Manisha kapadiya et. al. (2022) used wet cupping therapy in frozen shoulder stage 1 patient and found that pain dominant primary frozen shoulder can be successfully managed with wet cupping therapy.

The cupping therapy has variations in its application various study have studied the effect of

those variation on the shoulder movement in cases of frozen shoulder and adhesive capsulitis. Moving Dry Cupping Therapy Reduces Upper Shoulder and Neck Pain in Office Workers was reviewed by Yaman et. al.(2015), who concluded that Cupping treatment is a harmless and innocuous remedial application that is unquestionably used to reduce upper shoulder and neck pain in office workers.

The reason of improvement in group B with cupping therapy was it causes the tissue beneath the cup to be drawn up and swell causing increase in blood flow to affected area. Enhanced blood flow under the cups draws impurities and toxins away from the nearby tissues and organs towards the surface for elimination. Skin, fascia and muscle are pulled up into the cup stretching the tissue and drawing fresh blood into the area, providing nutrients to aid healing.

Thus proving the results in this study was in accordance to the study of M. Abid. According to M. Abid et. al. (2021).“The efficacy of cupping therapy in the treatment of frozen shoulder”. They discovered that regimental therapy Hijamah bila shurt (dry cupping) has a significant effect in reducing pain, stiffness of joints, and increasing range of motion in frozen shoulder.

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